Indiana Department of Environmental Management

2016 Ozone (O_3) Season Summary Report

Office of Air Quality
(800) 451-6027
www.IN.gov/idem/airquality/2391.htm

About This Report

The Indiana Department of Environmental Management (IDEM) collects and analyzes air samples to monitor for regulated pollutants, including ozone referred to as O_3. Monitoring and reporting of O_3 occurs from March 1 through October 31, as mandated by the U.S. Environmental Protection Agency (U.S. EPA). This ***2016 Ozone (O_3) Summary Report*** provides an overview of O_3, including 2016 data and air quality trends over the past 10 years (2007-2016).

The following information is included in this report:

- General information about ozone (*slide 3*)
- Overview of ozone air health standards and requirements (*slides 4-6)*
- Overview of Indiana's ozone monitoring network (*slides 7-8*)
- Summary of 2016 ozone monitoring data *(slides 9-10*)
- Ozone air quality trends over the last 10 years *(slides 11-13)*
- Status of ozone designations (*slides 14-17)*
- Links for additional information (*slide 18)*
- Contact information (slide 19)

What is Ozone (O_3)?

Ozone is a gas composed of three oxygen atoms that occurs throughout the Earth's atmosphere. Ozone occurs naturally in the stratosphere, approximately 10 to 30 miles above the Earth's surface, and forms a layer that protects life on Earth from the sun's harmful rays. Ozone also can form at ground level when other man-made pollutants react together in heat and sunlight. It is unhealthy to breathe at ground level.

Where does O_3 come from?

Ground-level ozone is not emitted directly into the air. It is created by a chemical reaction between nitrogen oxides (NO_x) and volatile organic compounds (VOCs) in the presence of sunlight. Emissions from industrial facilities and electric utilities, motor exhaust, gasoline vapors, and chemical solvents are some of the major sources of NO_x and VOCs.

What are the health effects of exposure to O_3?

Breathing O_3 can cause respiratory problems for sensitive groups, such as the very young, the elderly, or people with asthma or other chronic respiratory problems, including:

- Chest pain, coughing, throat irritation, congestion.
- Can worsen bronchitis, emphysema, asthma.
- Decreased lung function and inflammation of the linings of the lungs.
- Scars lung tissues.

National Ambient Air Quality Standards (NAAQS) for Ozone

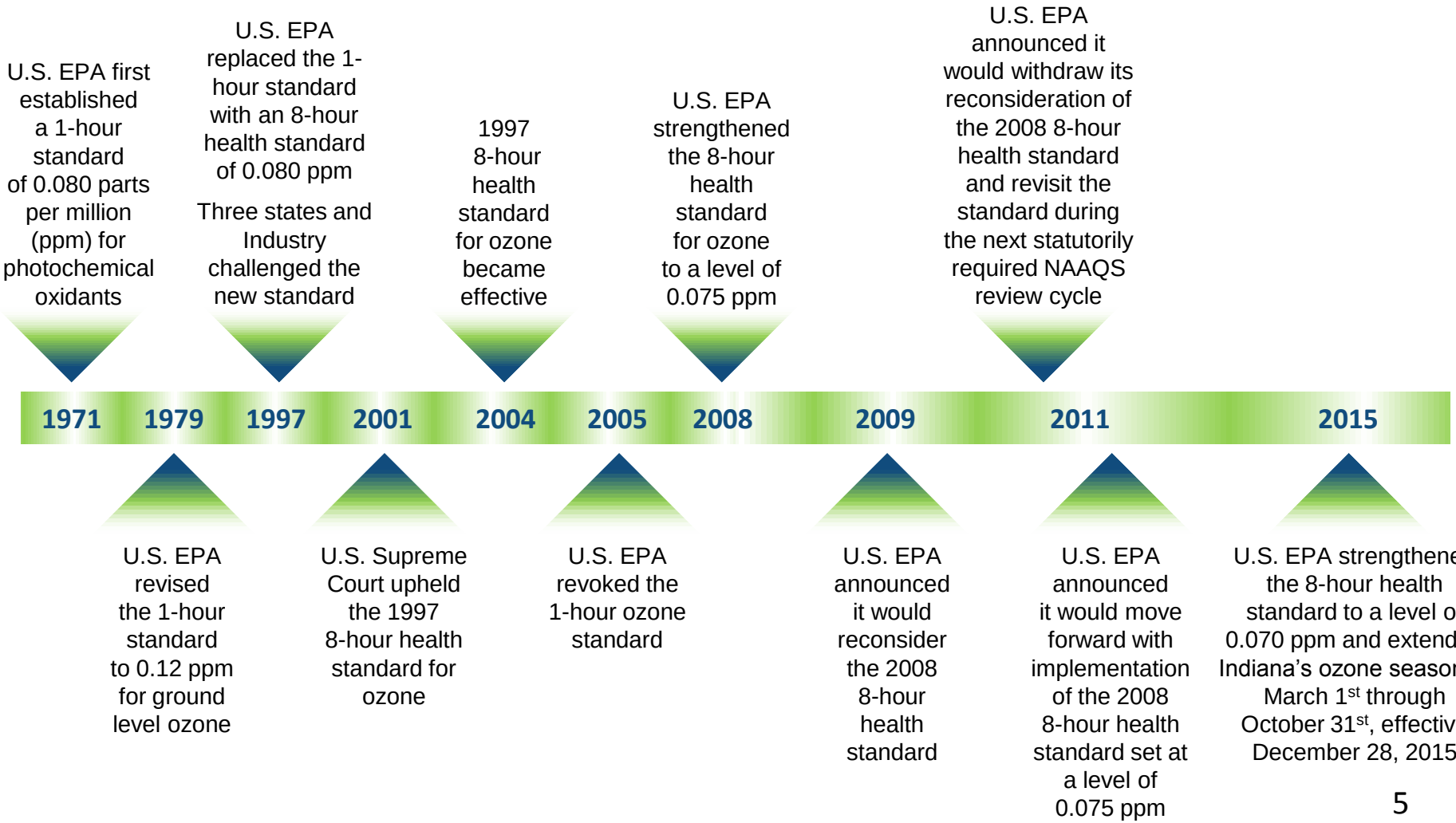
The federal Clean Air Act requires U.S. EPA to establish National Ambient Air Quality Standards (NAAQS) for certain pollutants, including ground-level ozone. NAAQS are also known as air health standards.

Primary and secondary NAAQS established in 1971 set limits for total photochemical oxidants. In 1979, U.S. EPA revised the NAAQS to regulated ground-level ozone. Since then, the NAAQS for ground-level ozone have been reviewed periodically and revised.

Primary Standards - Primary standards, also known as health standards, are limits set to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly.

Secondary Standards - Secondary standards are set to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

History of the Ozone Standard



Attaining the Ozone Standard

Air quality monitoring data must measure at or below the 8-hour standard set by U.S. EPA for three complete, consecutive years to remain in attainment of the primary and secondary 8-hour ozone standard. For example, an evaluation in 2017 will be based on data from 2014 to 2016.

8-Hour Ozone Standard – Air quality meets the 2015 primary 8-hour ozone standard when the fourth (4^{th}) highest daily maximum concentration value, averaged over 3 years, does not exceed 0.070 parts per million (ppm).

Design Values – The three-year average of the 4^{th} highest daily maximum concentration values is referred to as the Design Value.

The Difference Between an Exceedance and a Violation - When a monitor records a concentration above the limit established by the standard, it is referred to as an **exceedance**. A monitor can have an **exceedance** without being in **violation** of the standard. However, if a monitor's three-year **Design Value** exceeds the standard, the monitor is in **violation**.

2016 Ozone Monitoring Network

Placement

- U.S. EPA provides guidance on placement of monitors.
- Monitor placement is based on population density and manufacturing levels.
- Indiana conducts an annual review of its ambient air monitoring network plan.

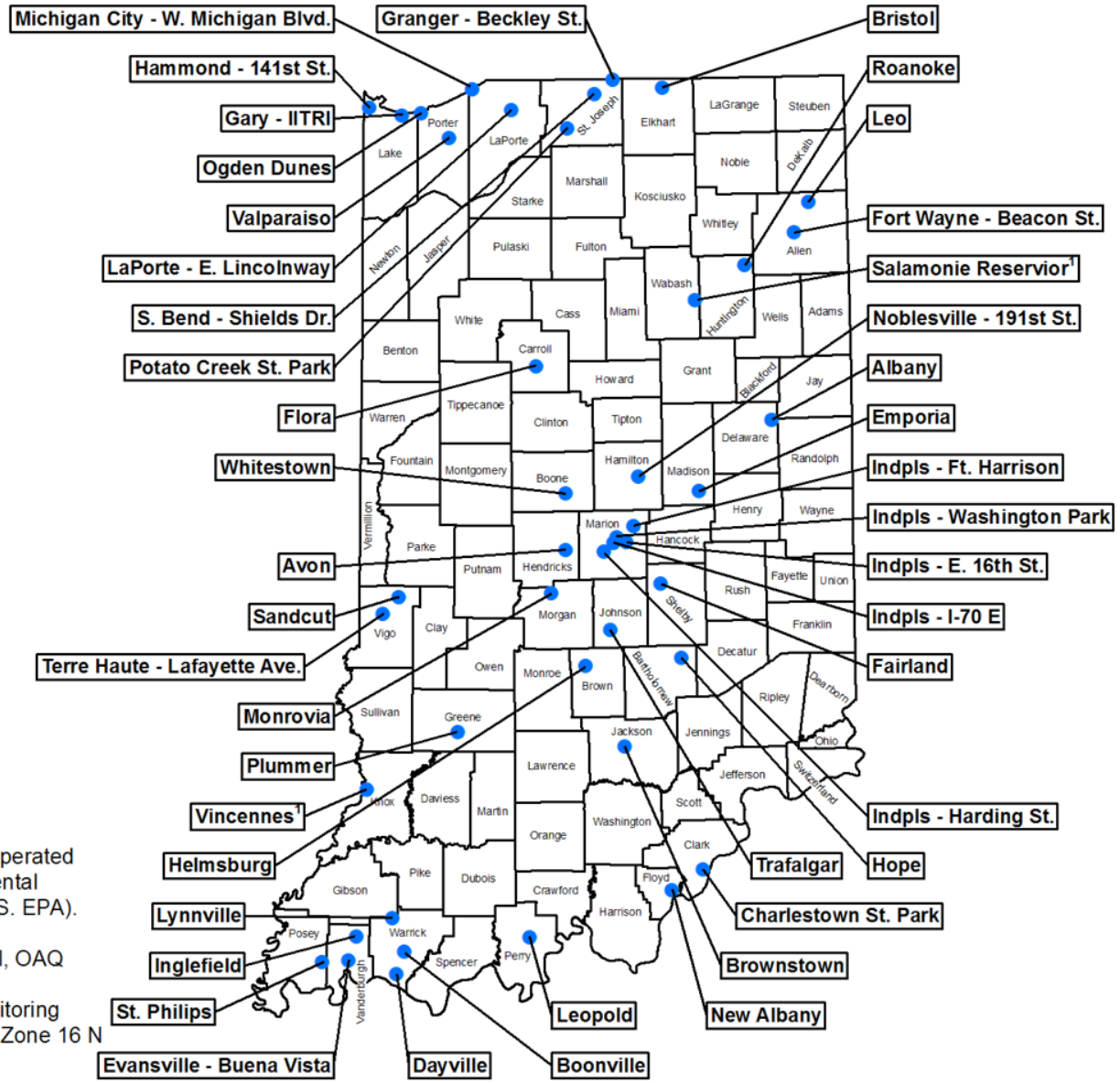
Monitors

- IDEM operated 44 ozone monitors in 30 counties across Indiana.

Calculating the Monitoring Data

- A monitor's Design Value is calculated at the end of each ozone season, once all of the data has been quality assured.
  - Ozone design value: three-year average of the 4th highest daily maximum concentration values.

2016 Ozone Ambient Air Monitoring Network



Legend

- Ozone Monitor

Notes:
[1] Monitors owned and operated by the U.S. Environmental Protection Agency (U.S. EPA).

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Date: 5/30/2017
Source: IDEM, Air Monitoring
Map Projection: UTM Zone 16 N
Map Datum: NAD83

2016 Ozone Monitoring Data Summary

Air Quality Action Days:

Twenty-four Air Quality Action Days were issued for ozone (*Indiana and local, state and regional partners analyze data and issue air quality forecasts year-round. Air Quality Action Days are issued when poor air quality is forecasted*.)

Exceedances:

Exceedances were recorded on twenty days. Exceedance is the term for a concentration that is recorded above the standard.

Quality Assured Monitoring Data:

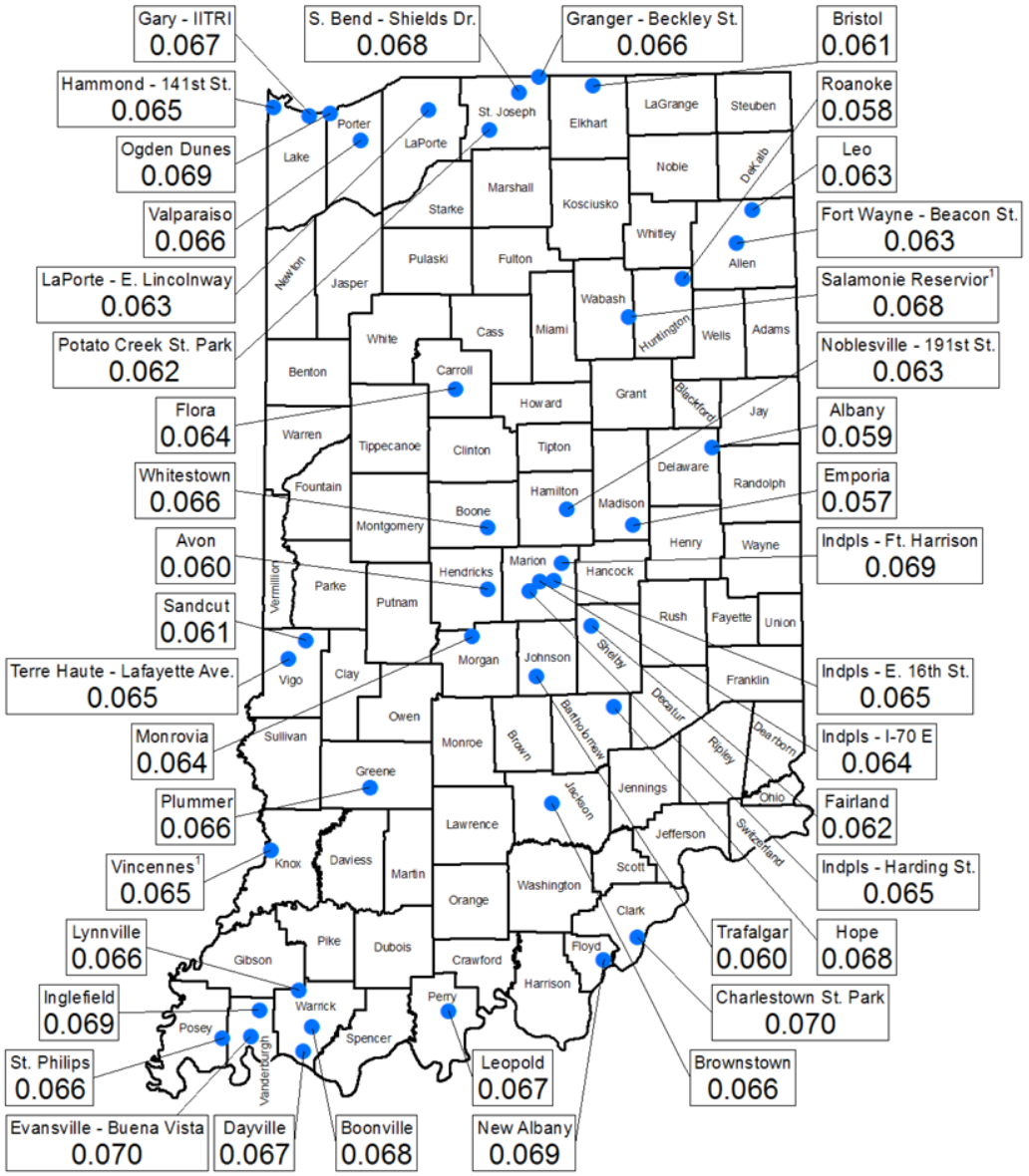
- Thirteen monitors had a 4th high daily maximum value above the current primary 8-hour standard of 0.070 ppm.
- More information about the 8-hour standard is on slides 4 through 6.

Quality Assured Monitoring Data for the 2014–2016 Three-Year Timeframe:

- No monitor had a Design Value (*the average* of the 4th highest daily maximum 8-hour ozone concentrations *over a three year period*) above 0.070 ppm.
- More monitoring data is found on slides 9 and 10.

Ozone 8-Hour Design Values 2014 - 2016

Standard set at 0.070 ppm



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- Ozone Monitor With Design Value Less Than or Equal to the Standard

Notes:

- Posted Data Are in Units of Parts Per Million (ppm)
- Data is quality assured but not yet certified.

[1] Monitors owned and operated by the U.S. Environmental Protection Agency (U.S. EPA).

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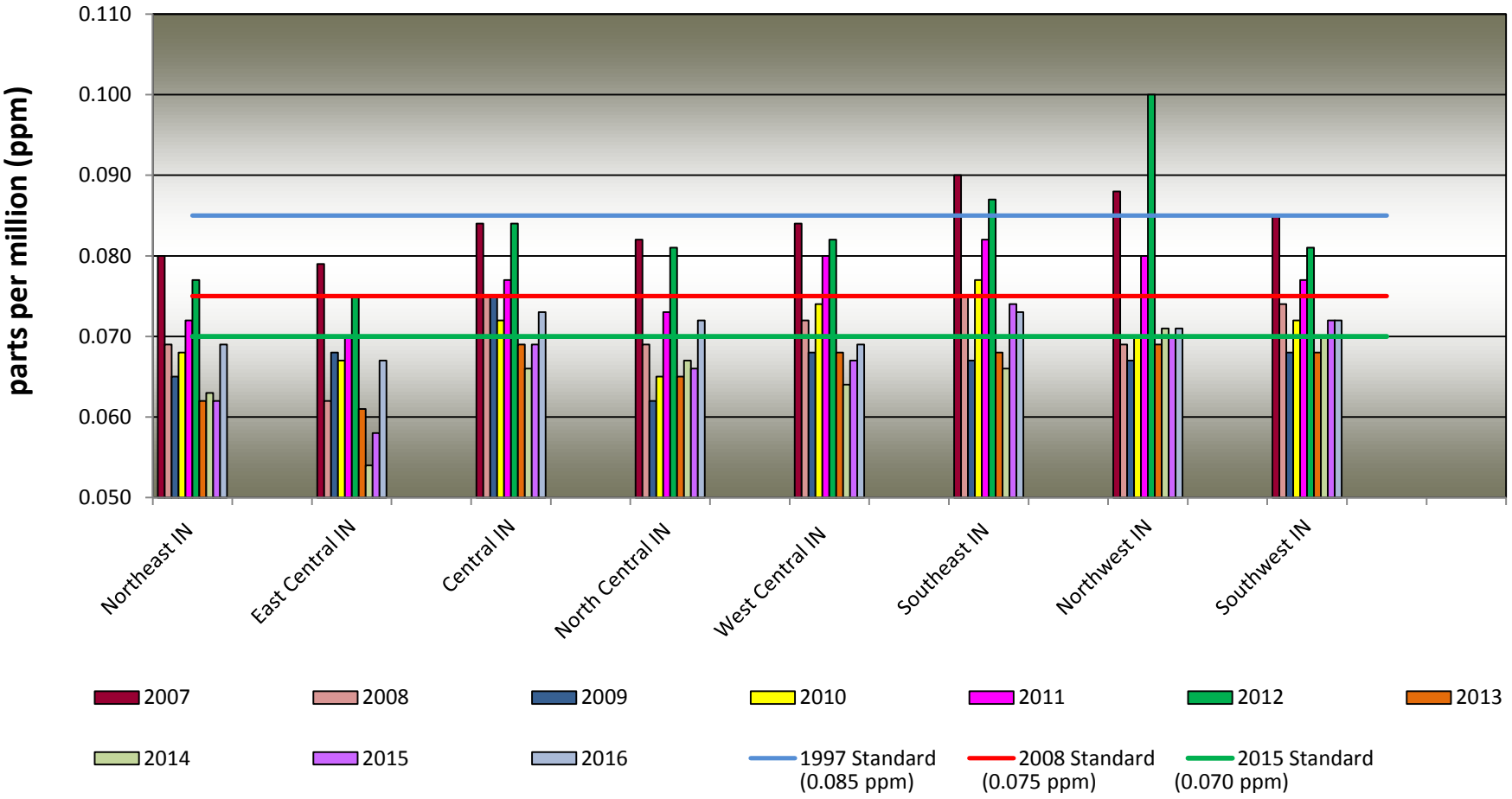
Ozone Air Quality Trends

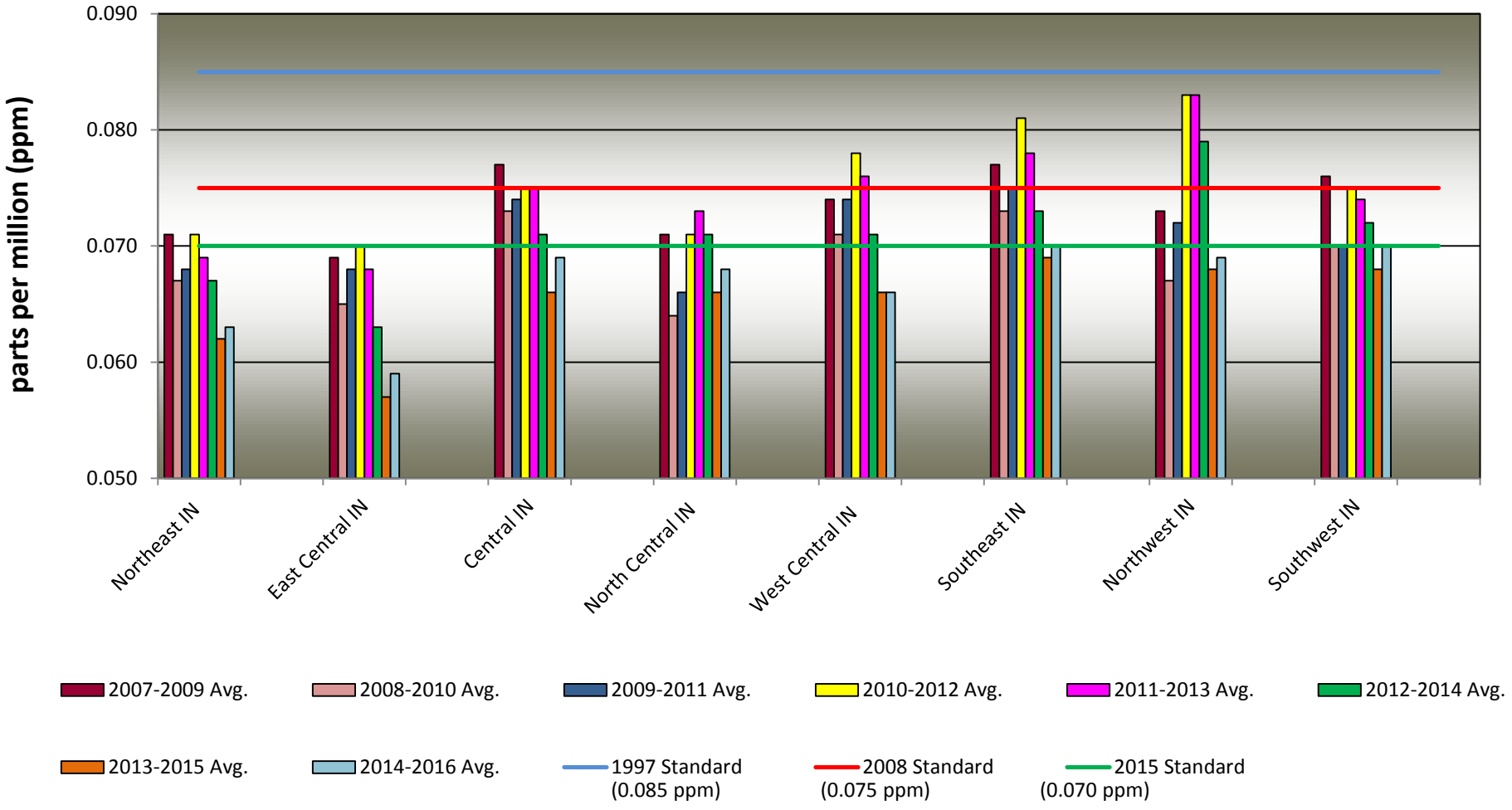
Monitoring data shows significant improvements in Indiana's air quality over the past 10 years. The following two slides provide illustrations.

Annual 4th High Trends 2007 – 2016



* In regions with multiple monitors, the highest monitored value from the region is depicted on the chart.

Design Value Trends 2007 – 2016



* In regions with multiple monitors, the highest monitored value from the region is depicted on the chart.

Ozone Designations

When a new NAAQS is issued, the implementation process begins. The first step is to identify any areas that do not meet the new standard. This is referred to as the designation process. U.S. EPA is responsible for designating areas that do not meet the standard. IDEM works to ensure that the designations are appropriate and that Indiana receives formal recognition for its achievements under the standards.

1997 Standards – U.S. EPA revised the former health standard in 1997 to 0.080 ppm. Designations were completed several years later, in April of 2004, following the resolution of legal challenges to the new standards. Although 23 counties and one township in Indiana were initially designated as nonattainment, subsequent monitoring data showed compliance. Indiana submitted petitions for the redesignation of all 12 areas. By May 2010, all areas of the state were reclassified to attainment status under the 1997 standard.

Ozone Designation (Cont.)

2008 Standards - The 8-hour standard was strengthened in 2008 to 0.075 ppm.

- On April 30, 2012, and May 31, 2012, U.S. EPA, based on 2008 – 2010 monitoring data, completed designations for Indiana. Lawrenceburg Township in Dearborn County and Lake and Porter counties were designated nonattainment, and classified as "marginal", effective July 20, 2012. All other areas of the state were classified as "unclassifiable/attainment".
- On February 23, 2016, IDEM, based on 2012 – 2014 data, submitted a redesignation petition and maintenance plan to U.S. EPA for Lawrenceburg Township.
- On April 11, 2016, U.S. EPA, based on 2012 - 2014 data, determined that Lake and Porter counties failed to attain the standard by the attainment date of July 20, 2015, and were reclassified from "marginal" to "moderate'' with an attainment date of July 20, 2018 (81 FR 26697).
- On February 28, 2017, based on 2012 – 2014 and 2014 – 2016 monitoring data indicating a three-year design value for the Chicago-Naperville, IL-IN-WI nonattainment area, which includes Lake and Porter counties, above the standard, IDEM submitted a state implementation attainment plan to U.S. EPA for Lake and Porter counties.
- On March 17, 2017, U.S. EPA approved the redesignation of Lawrenceburg Township to attainment with an effective date of April 7, 2017 (82 FR 16940).

Indiana's Ozone Nonattainment Areas

Legend

Nonattainment for the 2008 8-Hour Ozonel Standard

N W E S

0 25 50 mi
0 25 50 km

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Date: 05/30/2017
Source: IDEM, Air Monitoring
Map Projection: UTM Zone 16 N
Map Datum: NAD83

Ozone Designations (Cont.)

2015 Standards - On October 1, 2015, U.S. EPA finalized a rule to strengthen the 8-hour ozone standard to 0.070 ppm, and to extend the ozone season from March 1 through October 31, effective December 28, 2015.

- On September 16, 2016, Indiana submitted initial recommendations to U.S. EPA, recommending that all monitored counties be designated as attainment and all other counties in Indiana be designated as "unclassifiable". Indiana's recommendations are based on quality-assured, certified ambient air quality data for 2013 – 2015 and quality-assured data for the 2014 – 2016. Both of the aforementioned sets of data show that all monitors in Indiana are meeting the 2015 8-hour ozone NAAQS.
- On April 11, 2017, the United States Court of Appeals for the District of Columbia Circuit granted U.S. EPA's request to indefinitely delay oral arguments challenging the 2015 ozone NAAQS. No timeline has been established as to when U.S. EPA will complete the designation process.

Additional Information

- For additional Ozone monitoring information, visit IDEM's website: www.IN.gov/idem/airquality/2346.htm
- For additional information regarding the designation process or Indiana's redesignation petitions and maintenance plans, visit www.IN.gov/idem/airquality/2342.htm
- For additional information regarding the NAAQS for ozone, visit U.S. EPA's Ozone Standards website: https://www.epa.gov/naaqs

Contact

Please feel free to direct questions or comments to Ms. Catherine Mitchell with IDEM's Office of Air Quality at (800) 451-6027 (*toll free*), (317) 234-6530 (*direct*), or cmitchel@idem.IN.gov.